Due to the fast growth of science and technology, exploring multifunctional materials with high performance is a critical and urgently required issue. Double perovskites compounds are very fascinating and promising materials due to their structural flexibility and applicability in many fields such as electronics, magnetic materials, sensors, energy storage, ceramics, medical, military and aviation, etc. Tungstate double perovskites exhibit both emissions of the host (blue emission) and dopant. This unusual emission led to the idea of modulation of the structure and investigate the influence of structural modification on the luminescence of materials in terms of white light-emitting and temperature sensing.

One of two basic ways to create white light is mixing of three primary colours including red, green and blue. Based on this, dysprosium is chosen to embed into our compounds because it emits part of green and red which can combine with the blue of the host.

Temperature is one of the most important physical parameters which presents in many fields of science and life. In some specific environment like in vivo or in high pressure, high temperature, corrosive or flammable conditions where the conventional temperature sensors cannot work. To solve that problem, non-contact optical thermometers have been developed due to their ample advantages, including non-invasive measurement, high sensitivity, quick response, high spatial resolution. The optical thermometer is constructed based on the change in the emission intensity of the two transitions with temperature. In this project, the ratio between matrix emission and impurity will be used. The main advantage of this approach is that the influence of external factors will be excluded and a self-calibrating sensor will be developed.

The proposed materials are new and have not been studied before. This project will provide a better understanding of the role of structural modification on the optical properties, the energy transfer, position of the shift in host emission, the thermal stability, the colour of the emitted light, and the change in temperature sensing ability of samples.

This project not only broadens the knowledge of spectroscopic characteristics of these novel double perovskites, but also allows to design white-light-emitting phosphors and highly sensitive optical thermometers.